

SIGIR INSPECTIONS

During this quarter, SIGIR visited, assessed, and reported on nine construction projects across Iraq, yielding a variety of results. SIGIR found several high-quality projects that had good contractor quality control (QC) and sufficient U.S. government quality assurance (QA) programs in place. In other cases, however, SIGIR found serious construction shortfalls that stemmed from insufficient oversight and inadequate contractor performance. Recurrent construction problems at various projects included deficient concrete pours and substandard plumbing installation. Security also continued to be an impediment to both oversight and construction. Safety concerns at several sites prevented SIGIR assessment teams from conducting full assessments.

SIGIR's presence across Iraq continues to exercise a positive effect on reconstruction efforts. For example, SIGIR's Quick Reaction Report on the Baghdad Police Academy, which SIGIR conducted after receiving complaints about substandard construction work at the site, prompted rapid responses to remediate the problems by both the U.S. government and contractors. As of October 2006, SIGIR has completed 65 project assessments, 96 limited on-site inspections, and 220 aerial assessments.

Project Assessments: Findings at a Glance

Al Karkh Courthouse (\$2.23 million)

- The SIGIR assessment team could not visit the site because of security concerns; there-

fore, the assessment was based on contract files, oversight reports, and satellite imagery reviewed by SIGIR imagery analysts.

- The project was sufficiently well-designed by the contractor and will meet objectives.
- The contractor QC plan appeared adequate.
- The U.S. government QA plan appeared adequate.
- The project results to date indicate that the project will meet task order objectives.

Thi-Qar Village Roads Segment 3 (\$1.44 million)

- The design provided by the contractor was sufficient to achieve project goals.
- The site construction was consistent with the intent of the project. However, security conditions prevented the SIGIR assessment team from visiting the project site to inspect the roads. Therefore, the assessment was based on contract file information provided by management and on a SIGIR and imagery review of information provided by the National Geospatial-Intelligence Agency (NGA).
- The contractor did not submit a QC plan; however, the U.S. government QA program adequately ensured that the lack of a contractor QC plan did not have a negative impact on the project's successful completion.
- The project met original contract objectives.

Critical Care Unit, Ibn Al Bitar Hospital (\$0.58 million)

- The contractor's design and construction work was sufficient.
- The contractor's QC plan was not sufficiently detailed to effectively guide the contractor's Quality Management (QM) program.
- The U.S. government QA program effectively monitored the contractor's QC program.
- The project, when completed, should be consistent with the contract objectives.

Baghdad Municipal Solid Waste Landfill (\$28.8 million)

- The project components were adequately designed before construction.
- In the vehicle maintenance building, SIGIR noted deficiencies with the electrical generator, electrical wiring, and building exterior.
- The project results should be consistent with the original contract objectives.
- At a site visit in June 2006, SIGIR determined that the landfill was not being used because of security issues in the area; however, a plan to secure the area and use the landfill was being implemented.

Al Kut Training Academy (\$22.9 million)

- With one significant exception, all major components reviewed during this limited scope assessment were sufficiently designed to construct a fully operational training academy. The exception was the newly constructed septic/sewer system, which

could not handle the volume of water directed to it.

- The construction and rehabilitation of the facility appeared to meet the standards of the design, except for construction of some wastewater piping, concrete work, and other areas of construction workmanship.
- QM practices were not completely effective during critical periods of construction because the contractor did not implement a deficiency tracking system to ensure that construction deficiencies were identified, tracked, and corrected in a timely manner.
- The facility was being used for its intended purpose of training Iraqi military and law enforcement personnel.

Ninewa Provincial Police Headquarters (\$1.0 million)

- The design and specification of components before installation and construction were minimally adequate.
- Construction and rehabilitation did not meet design standards or specifications because the contractor did not demonstrate professional quality craftsmanship on construction and completed repair work.
- The contractor's QC program and the government's QA program were not effective.
- Project results were not consistent with the original objective to repair and reconstruct the facility. Numerous required work items were not carried out by the contractor, and finished work was often substandard.

Bab Eshtar Substation—11 kV Feeder Cable (\$1.22 million)

- The project components were adequately designed before construction and installation.
- Construction work complied with the design standards.
- The contractor's QC and the government's QA programs were adequate.
- When completed, the project should meet its intended objective to supply, install, test, and place in service a 12 x 11 kV underground cable feeder to the Bab Eshtar substation.

Baghdad Police College (\$94 million)

SIGIR identified construction deficiencies that required prompt attention and separate reporting:

- Improperly fabricated wastewater plumbing within the student barracks could potentially result in the reduced load-carrying capacity of the structural slabs, as well as environmental and health hazards to the students, instructors, and workers.
- The extent of potential hazards must be determined before any further work is performed on the facility.

Planning

SIGIR selected a cross-section from each of the major reconstruction sectors to assess, survey, and analyze:

- projects involving water, electricity, oil facilities, and transportation

- projects involving large and small contract amounts
- projects of different general contractors
- projects in different sections of the country
- projects in programs of each of the major U.S. agencies
- projects that were fully completed and partly completed

On-site Project Assessment Program Approach

Since June 2005, SIGIR has completed 65 project assessments—9 during this quarter. These were the general objectives of the project assessments:

- Were project components adequately designed before construction or installation?
- Did construction or rehabilitation adequately meet the standards of the design?
- Were the contractor's QC plan and the government's QA program adequately carried out?
- Were project sustainability and operational effectiveness adequately addressed?
- Were project results consistent with the original objective?

Table 3-4 lists project assessments completed this quarter. For a complete list of project assessments from previous quarters, see Appendix I. Figure 3-1 shows the approximate location of each project.

NINE PROJECTS ASSESSED THIS QUARTER (DOLLARS IN THOUSANDS)

PCO ID	PROJECT NAME	GOVERNORATE	BUDGETED TOTAL COST	EXECUTING AGENCY	CONTRACTOR	GRD REGION
16104	Al Karkh Courthouse—Baghdad	Baghdad	\$2,230	GRD	Foreign	Central
17867	Thi-Qar Village Roads Segment 3	Nasiriyah	\$1,440	GRD	Foreign	South
NA	Ibn Al Bitar Hospital—Critical Care Unit	Baghdad	\$580	GRD	Foreign	Central
12485	Baghdad Municipal Solid Waste Landfill Facility	Baghdad	\$28,800	GRD	Fluor-Amec, LLC	Central
NA	Training Academy—Al Kut	Al Kut	\$23,000	GRD	ECCI	North
NA	Ninewa Provincial Police Headquarters	Mosul	\$1,000	GRD	Foreign	North
NA	Bab Eshtar Substation-11 kV Cable Feeder	Mosul	\$1,220	GRD	Foreign	North
NA	Baghdad Police College (Academy) (2 projects)	Baghdad	\$94,000	GRD	Parsons	Central

TABLE 3-4

PROJECT ASSESSMENTS

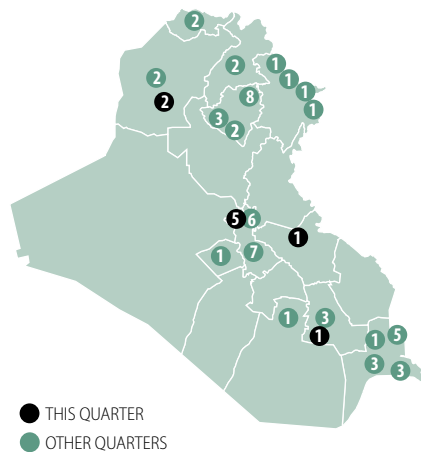


Figure 3-1
APPROXIMATE LOCATIONS OF THE 65 PROJECTS WHERE INSPECTIONS WERE CONDUCTED, ANALYZED, AND REPORTED TO DATE

SIGIR Project Assessments

Al Karkh Courthouse, Baghdad, Iraq

SIGIR-PA-06-058

The objective of the Al Karkh Courthouse project was to construct and secure a court facility to support implementation of the rule of law in Iraq. This project was constructed under a design-build contract and funded at \$2,333,582. The courthouse is in the north-western part of Baghdad in a previously open agricultural area. Based on the design provided by the U.S. Army Corps of Engineers (USACE), the Al Karkh Courthouse project included construction of these buildings and facilities:

- perimeter wall
- checkpoints
- internal roads and parking areas
- courthouse building
- electrical transformer vault building and emergency electrical generators
- maintenance/water storage building
- cafeterias
- exterior bathrooms
- kiosks
- landscaping and gardens

In addition to these facilities, the courthouse complex contained an annex building that was being constructed concurrently with the courthouse project. However, the annex project was a separate requirement under a different task order and not part of the scope of SIGIR's assessment.

At the time of the SIGIR assessment, the project was reported as 92% complete. Remaining work included the completion of construction on the courthouse building, as well as other buildings in the complex (main-tenance/water storage, cafeteria, etc). Other required work items—including landscaping and final paving—were not yet accomplished. Remaining work also included the requirements for additional security features at the courthouse building. The compound's utility systems (water, sewer, and electric) also needed to be connected to the municipal systems.

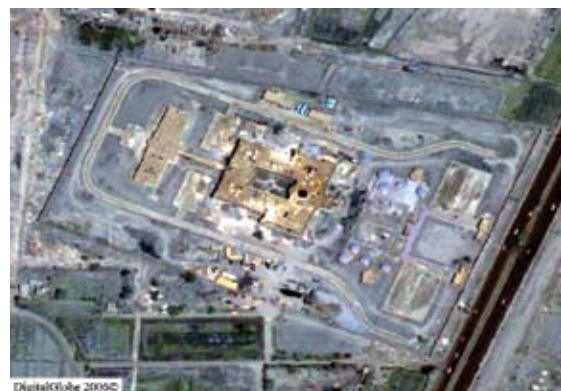
What We Found

The SIGIR evaluation was based on a review of the contract file documentation, including QA reports, progress photos, and interviews of USACE Resident Office personnel and GRD-PCO staff. In addition, SIGIR's imagery specialists analyzed commercially available satellite imagery of the courthouse site to independently verify the construction progress (Aerial Images 1 and 2). A site assessment team did not visit the location because SIGIR was advised that doing so would have endangered those working at the site.

SIGIR found that construction from project start though July 3, 2006, appeared to meet the requirements of the design. The workmanship was adequate to construct the courthouse complex buildings and other facilities. SIGIR raised concerns about the ceramic tile installation practices and the quality of the water circulation pumps. However, project documentation



Aerial Image 1. Courthouse site on August 10, 2005.



Aerial Image 2. Courthouse on May 16, 2006.

indicated when the problems in workmanship occurred. USACE Resident Office staff identified deficiencies and managed the contractor's corrective actions.

Sustainability

The contract specifications required the contractor to provide and certify warranties in the name of the appropriate ministry for all equipment—including any mechanical, electrical, and electronic devices—and all operations for 12 months after issuance of the taking-over certificate. The contractor was to provide:

- any other commonly offered extended warranties for equipment and machinery purchased
- two sets of complete operation and maintenance manuals, including all generator and equipment information, electrical single-line diagrams, schematics, and maintenance information
- technical training from the system manufacturer for up to ten personnel
- spare repair parts, as recommended by the

system manufacturer, for one complete year of operation

The contractor was to complete all inspection and commissioning requirements before the final inspection.

No recommendations were included in the project assessment report, and USACE concurred with SIGIR's findings.

Thi-Qar Village Roads Segment 3, Thi-Qar, Iraq

SIGIR PA-06-059

The project objective of the Thi-Qar Village Roads Segment 3 project was to construct a 7.1-km paved village road in the governorate of Thi-Qar for everyday use by the local population. The 170-day project was contracted at \$1,441,858. The project was completed on July 26, 2005. At the time of the SIGIR assessment, in April 2006, security conditions prevented the team from visiting the project site to observe the completed roadway.



Site Photo 1. Section of Thi-Qar Village Road before construction.
(Photo provided by USACE)

What We Found

Based on the SIGIR assessment team's review of the contract file, a summary of information received from NGA, and interviews with the USACE staff, SIGIR found that the construction appeared to be consistent with the intent of the project. The government QA program effectively monitored the project quality. The contract documentation provided to the assessment team did not include a QC plan, QC reports, or deficiency logs. However, the USACE Area Engineer's appraisal evaluated the overall quality of workmanship as above average.

The USACE Resident Office had dispatched a Quality Assurance Representative (QAR)—a local Iraqi national—to the project site to inspect the Thi-Qar Village Road and to take pictures showing current conditions. SIGIR's assessment team reviewed the photos (Site Photos 1 and 2). Minor discrepancies noted during the inspection process do not appear to have adversely affected the overall condition of the road. The summary prepared by NGA

Site Photo 2. Section of Thi-Qar Village Road after construction.
(Photo provided by USACE)



stated that the Thi-Qar Village Road Project “was completed according to contract specifications. The original road was constructed from an unpaved, loose gravel route that paralleled a canal. Aggregate was probably added to the road's surface and the canal bank. The road was paved, and several small foot bridges that span the canal were constructed. The southernmost section of the Thi-Qar Village road was improved most by the project. Before construction, it was not able to support vehicular traffic because of erosion and neglect.”

No recommendations were included in the project assessment report, and USACE concurred with SIGIR's findings.

Critical Care Unit, Ibn Al Bitar Hospital, Baghdad, Iraq

SIGIR PA-06-066

The objective of the project was to design and construct the Critical Care Unit (CCU) at Ibn



Site Photo 3. First-floor columns and beams supporting roof.

Al Bitar Cardiac Hospital because the original facility had been looted and burned down. USACE executed a firm fixed-price, design-and-construct contract for the facility, and the contract was awarded to a local Iraqi firm for \$579,285. The hospital is in an urbanized area of Baghdad.

What We Found

Although the original scope of work required a two-story building, the Bill of Quantities (BOQ) in the original contract did not plan for enough material to complete the work required for a two-story CCU building. Further, there were not enough funds to provide construction material to complete the building's first floor (the second story). Therefore, with input from the Director General of the Ibn Al Bitar Hospital, the USACE Resident Office negotiated an agreement with the contractor to use the available funds to completely construct

the ground floor and only a shell for the first floor (structural concrete frame, including the roof, Site Photo 3). Further, the telephone and oxygen piping systems were removed from the scope. In addition, the central HVAC system was replaced by individual room HVAC units.

Based on a review of USACE QA reports, construction photos, and a visit to the site, SIGIR found that the work completed to date appeared to be consistent with the standards of the contract design. The USACE Deputy Resident Engineer and staff capably managed the project. As a result, the Ibn Al Bitar Cardiac Hospital should receive a new and functional Critical Care Unit.

The contractor's QC plan was not sufficiently detailed to effectively guide the contractor's QM program. However, the contractor submitted daily QC reports with information on work accomplished each day, specifying the location, activity, test results,



Site Photo 4. Exposed geomembrane liner.

Baghdad Municipal Solid Waste Landfill, Baghdad, Iraq

SIGIR PA-06-067

deficiencies and corrective actions, equipment used, and material received on site.

The government QA program was effective in monitoring the contractor's QC program. The QAR prepared daily QA reports about the project to document construction progress and to highlight deficiencies, including detailed photographs to support the narrative. The USACE QAR did not maintain a continuous QA deficiency log, but deficiencies were documented in daily non-conformance logs and in the QA reports. Further, the QAR and District Resident Engineer (DRE) ensured that the deficiencies cited during QA inspections were corrected.

Sustainability

A review of the contract file and discussions with the USACE DRE disclosed no sustainability issues associated with the project. The contract required the contractor to warrant its equipment, material, design furnished, and workmanship, for one year from the date of acceptance. There is an additional requirement for on-the-job training for operations and maintenance of the fire-alarm and water systems, including the water heaters, water softener, and pumps.

No recommendations were included in the project assessment report, and USACE concurred with SIGIR's findings.

The objective of the Baghdad Landfill project was to design and construct a regional municipal solid waste (MSW) landfill for Baghdad. An ancillary objective was to make maximum use of subcontractors, suppliers, craftsmen, and laborers in the local area to maximize rapid employment opportunities for local Iraqis.

The Baghdad Municipal Solid Waste Landfill was constructed under a design-build, indefinite-delivery/indefinite-quantity contract with a \$600 million ceiling. The contract required the design, construction, equipment procurement, commissioning, initial operations, and training for a solid waste landfill. The project was funded with an allocation from the DFI, with total funding at \$28,849,930. At the time of SIGIR's assessment, the project was reported in the July 7, 2006 USACE-PCO database as 100% complete.

What We Found

The MSW landfill construction project involved approximately 24 acres on the eastern part of the site. The MSW landfill site components visible for inspection included the geomembrane liner system, a drainage layer, a perimeter berm, and a leachate collection system. The geomembrane liner and geotextile cover were in place in every part of the 24-acre section (Site Photo 4). However, on approximately 25% of the section in the northeast quadrant, the gravel base and sand cover had

not been spread over the liner and geotextile protective cover. Many sections of the geotextile fabric in the uncovered part of the MSW landfill needed to be seamed.

The drainage layer of sand over gravel is supported by a compacted cohesive soil subgrade. The geomembrane liner and the geotextile cover lie between the subgrade layer and the gravel. The drainage layer was in place on approximately 75% of the 24-acre MSW landfill. SIGIR could not verify thicknesses of the sand layer and gravel layer, but the surface of the sand layer appeared to be graded and finished in accordance with the design (Site Photo 5).

The perimeter berm around the MSW landfill comprised an embankment of various heights constructed with a horizontal to vertical slope. SIGIR observed the berm in place along the perimeter of the MSW landfill. In the unfinished areas of the landfill, the liner along the inside of the berm will require remedial work to ensure that it is placed and anchored properly (Site Photo 6).

As designed, the leachate generated within the landfill, when operational, will percolate through the sand-gravel drainage layer to the liner. The landfill floor and overlaying liner is sloped so that the leachate will drain into a collection trench. SIGIR also inspected the four leachate collection pump stations—the



Site Photo 5. Surface of the drainage layer.



Site Photo 6. Section of the perimeter berm requiring remedial work to anchor the liner.

exposed features of the pump stations (concrete housing, access cover, ventilation pipe, etc.) appeared to be constructed as designed.

The Baghdad MSW Landfill Facility was substantially complete in November 2005. However, the project was closed out before completion because security issues presented a health threat and security risk to coalition forces and Iraqis working at the site. The landfill site is in an area of recurring violence. The contractor reported that since the beginning of earthwork construction, the project site had been the scene of vandalism, violence, extortion, kidnappings, and the death of subcontractor personnel.

Additionally, the contractor's workers at the landfill site were subject to indirect and direct fire, as well as threats and warnings not to work on the landfill project. Because

of the security issues, the contractor filed a claim for the escalating costs on the previously negotiated material and labor agreements. In November 2005, the Joint Contracting Command-Iraq/Afghanistan (JCC-I/A) settled the claim for approximately \$2.4 million.

Because of funding limitations, increasing costs, and the degraded security situation, JCC-I/A directed the contractor to complete all work on the project no later than October 31, 2005. When construction ended at the landfill site, approximately 25% of the MSW landfill's liner still needed to be covered with the sand-gravel drainage layer.

Sustainability

The contract design package included the operations and maintenance (O&M) manuals for the day-to-day operation of the landfill and

for the leachate collection system pumps. The contractor was required to submit a training plan to accommodate the required number of staff to manage and operate the landfill and to provide at least one full-time person for at least two months of on-site training and supervision. The contractor provided training materials, including two study guides.

Since construction ended and the contractor demobilized, the landfill has not been used. According to one U.S. Embassy Military Liaison Officer to the Amanat, the public works directorate for the city of Baghdad:

Ongoing security incidents—ranging from IED emplacement, murder of Amanat sewer staff at the adjacent Al Kerkh WWTP, small arms and mortar attacks, and the intimidation of WWTP and landfill workers—have prevented the local Iraqi government from commissioning these two key infrastructure sites [Al Kerkh WWTP and the landfill facility] supporting public health/security within the city of Baghdad.

As a result, the Baghdad MSW landfill remains vacant. However, there is a plan to reactivate the landfill and promote its usage. According to the U.S. Military Liaison to the Iraqi Municipal Government, coalition forces are coordinating with the U.S. Agency for International Development (USAID) to establish a management staff with the local government. Implementation of the plan is ongoing, and the local government started using the landfill for trash disposal on August 13, 2006. Full implementation, with trucks hauling solid waste to the landfill, is projected

for November 2007.

No recommendations were included in the project assessment report, and USACE-GRD concurred with SIGIR's findings.

Al Kut Training Academy, Al Kut, Iraq

SIGIR PA-06-069

The initial objective of the Al Kut Training Academy project was to plan, construct, and renovate a complete, secure training academy—including perimeter walls, barracks, office space, classrooms, a dining facility, fencing, firing ranges, a laundry, and a physical conditioning field for Iraqi security and safety forces. Subsequently, the project's objective expanded to include training facilities, housing, classrooms, offices, dining facilities, a clinic, a gymnasium, a warehouse, a laundry, and other support facilities for the cadets and instructors of the Iraqi Police (IP), Department of Border Enforcement (DBE), and for the Iraqi National Guard (ING).

The Al Kut Training Academy facility is approximately 180 km southeast of Baghdad and across the Tigris River from the city of Al Kut. The training academy was to be constructed on a small part of an old Iraqi military base. Currently, the base is used by MNF-I coalition forces. The construction site is secure within the guarded perimeter of the existing MNF-I base. The flat site, with some existing structures and road access, posed no significant obstacles to construction.

Before construction, structures at the project location included a number of deteriorated masonry buildings, dining facilities, and



Site Photo 7. Standing wastewater pooled on academy grounds. (Photo courtesy of ECCI)

a gymnasium. Although looted and vandalized, the existing structures were evaluated and considered structurally sound. Suitable electrical, water, and wastewater systems were not available on site. Therefore, the contract requirements included the design and installation of electrical, water, and wastewater systems.

What We Found

On July 3-4, 2006, SIGIR's assessment team conducted on-site inspections of the Al Kut Training Academy. At the time of the site visits, construction and facility functionality was almost complete. The facility was in use for the intended purpose of training IP, ING, and DBE personnel. All of the buildings were constructed. However, a major barracks building was not in use because of significant subcontractor work activities to repair damages that resulted from previous construction deficiencies. Although the utility systems were operating, plans to correct deficiencies in the wastewater and electrical systems were in progress at the time of the site visit.

Construction deficiencies were not identified during initial construction because the contractor did not implement an effective deficiency-tracking system during critical periods of construction from May 1 to August

31, 2005. At the same time, government QA personnel did not effectively interact with contractor personnel to ensure effective quality management. During this timeframe, the project completion grew from 25% to 97%.

As a result, latent construction deficiencies that were not evident when accepted by the government subsequently turned into much larger rework issues. In addition, SIGIR observed many examples of substandard workmanship quality during the site visit; some have the potential to become significant rework or safety issues in the future. Included in this summary are the more significant observations.

The design and installation of the septic tanks system were inadequate to support the population of the academy. There was no requirement for a drain field in the original design, which depended on pump trucks to remove any excess effluent. Insufficient soil drainage, limited pump truck capacity, and a daily water volume input that exceeded septic tank capacity contributed to the problem, resulting in substantial overflow of wastewater from the septic system and pooled on academy grounds (Site Photo 7).

Dormitories accepted by the government on August 31, 2005, and December 9, 2005, required extensive rework of the bathrooms to correct defective plumbing construction that should have been detected, monitored, and corrected during construction (Site Photo 8). Specifically, the connections between the smaller-diameter feeder drain lines and the larger-diameter main drain line system were

not water-tight because positive connection (glued or threaded) reducers and fittings were not used until the deficiencies were corrected. When corrected, the contractor improved the plumbing design and upgraded the materials (Site Photo 9).

While on site, the assessment team observed several concrete issues. For example, a section of roadway was poured with no hydration until much later in the day. July afternoon temperatures at Al Kut often exceed 110 degrees Fahrenheit. In addition, the concrete was not cast to the full thickness of the roadway along the long edge of the casting. Rather, the fresh concrete was layered unevenly over the existing roadway. Several meters away on the same road, a SIGIR inspector pulled up several pieces of cured cement by hand (Site Photo 10). In addition, concrete patchwork was often cast too thin or placed unevenly (Site Photo 11).

The assessment team observed horizontal fractures that ran almost the entire perimeter

of the newly constructed middle and eastern barracks building foundations (Site Photos 12 and 13). Although not as obvious, similar horizontal fissures were observed on the second floors of the dormitories.

During the assessment, the contractor's Project Manager confirmed that concrete placement was conducted using small batches mixed by hand. Small hand-batch mixing and improper joining techniques could have contributed to the horizontal fractures and other concrete issues observed: the numerous small batches mixed by hand were not consistent. For expediency, each small batch was not subjected to a slump test.

Although the capacity of the electrical generators installed proved to be insufficient, the contractor was in the process of supplementing generator capacity at the time of the site visit. Specifically, an additional 1.0-MW generator was on order and pending delivery to ensure sufficient power capacity and increased emer-



Site Photo 8. Extensive rework was required in dormitories to install watertight plumbing fittings. (Photo courtesy of ECCI)



Site Photo 9. Reworked drain lines with upgraded material and improved "Y" design.

Site Photo 10. Weak and crumbly concrete piece pulled from roadway by hand.



Site Photo 11. Substandard patchwork in Academy HQ sidewalk.



Site Photo 12. Horizontal fracturing along foundation of Middle Barracks.



Site Photo 13. Close-up of the horizontal foundation fracture in the East Barracks.

gency or standby capability for the IP area. In addition, a 400-KW generator for the ING area was on-site and pending commissioning.

Sustainability

The U.S. government planned to turn over operations of the facility to the Iraqi government after project completion. The initial contract required a one-year construction warranty on all materials and workmanship for the buildings and facilities constructed or renovated. The task order required as-built drawings depicting buildings and footprints, O&M manuals in English and Arabic, manufacturer warranties, a preventive maintenance plan, and mechanical systems training and manuals. Although latent defects could become problematic, long-term sustainability will be enhanced by the government's action to obtain an extended warranty coverage period to offset the effects of any latent defects.

The USACE concurred with SIGIR's findings and is having the warranty extended to ensure that deficiencies are corrected.

Ninewa Provincial Police Headquarters, Mosul, Iraq

SIGIR PA-06-072

The objective of the project was to repair and construct facilities at the Ninewa Provincial Police Headquarters. The facilities to be refurbished included a large, three-story masonry block structure, a two-story masonry block structure, an auditorium, and a pedestrian entry building. New construction concentrated on a visitor's center and a large latrine and

shower. Project requirements included design-build plans for new construction, repair, and refurbishment for existing facilities, as well as debris removal and general cleanup for the facility.

The Ninewa Provincial Police Headquarters project was funded for \$988,178 through a firm fixed-price contract, awarded August 18, 2005, to a local Iraqi company by USACE.

What We Found

The construction or rehabilitation did not meet design standards or specifications because the contractor did not demonstrate professional-quality craftsmanship on construction and completed repair work. The contractor did not follow design criteria specified in the Statement of Work (SOW) and BOQ. SIGIR noted many defects and poor workmanship throughout the site; substantial rework and work will be necessary to correct defective workmanship or finish uncompleted tasks required by the SOW and BOQ.

For example, the contractor was required to construct a new shower/latrine facility attached to the guard company building, comprising 10 individual showers, 12 toilets, 10 urinals, 10 sinks, and a changing room. However, the contractor built only a small shed-size facility with just one shower, one toilet, one sink, and no changing room. If the contractor had built the shower/latrine in compliance with contract requirements, two trees would have required removal. Neither tree was removed. The first tree is shown to the far left of the photo, and the second tree is shown in the photo's center.



Site Photo 14. Trees were not removed when the new latrine was built.

Rather than removing the second tree, the contractor cast the latrine's concrete roof around the tree (Site Photo 14). The new latrine was not only missing numerous requirements, but the finished construction was substandard.

Although the SOW and Statement of Requirements and Specifications (SORS) clearly required latrines/bathrooms and showers to have tiled and grouted walls from floor to ceiling, with new piping, fixtures, and faucets, the contractor's performance was substandard in nearly all the bathrooms observed during SIGIR's on-site visit. Generally, plastered walls and existing tile throughout the facility were merely painted over (Site Photos 15 and 16).

In addition to substandard construction issues throughout the facility, SIGIR found many instances of inadequate quantity of deliverables. For example, the contractor installed



Site Photo 15. Painted plaster shower wall should have been grouted tile, floor to ceiling.



Site Photo 16. Existing wall tile was painted, and existing leaking faucets were not replaced. The left faucet in the photo's center was capped/disabled rather than replaced as required.

only two of six required split-unit air conditioner systems in the new reception center building (Site Photo 17).

Table 3-5 shows the status of air conditioner installation on the project. The contractor installed only 53 of 134 air conditioners.

On February 20, 2006, the contractor reported, “Today we operate generator with new wiring and connections.” However, the contractor merely delivered the generator—without starting or load-testing it (Site Photo 18). U.S. Army personnel familiar with the history of the generator attested that IP personnel placed the generator on a concrete pad and installed an old fuel-truck tank to supply the generator (Site Photos 19 and 20). At the time of the assessment team’s August 3, 2006 site visit, the generator was non-operational.

QM practices were not effective. The government’s QAR did not effectively engage the contractor’s QC personnel or effectively monitor project status throughout the life of the project. In addition, the contractor submitted vague QC reports that included very little detail related to specific tasks and locations, and none included accurate disclosure about completion percentages. SIGIR inspectors concluded that it was not prudent for the government’s QAR to rely on the contractor’s QC reports as a basis for monitoring the project. In short, the government’s QAR did not implement an effective system to detect deficiencies as they occurred and to monitor and initiate corrective action in a timely manner.

In November 2005, the contractor was paid 50% (\$494,089) of the value of the fixed-price

contract. USACE rejected the contractor’s March 10, 2006 invoice that demanded final payment because the contractor claimed all work was complete. To minimize harm to the government, an action to terminate the contract was pending at the time of the assessment team’s site visit on August 3, 2006. That action was based on USACE’s technical evaluation of work performed by the contractor. Based on the circumstances, contract termination was the most practical solution.

Sustainability

Project sustainability was adequately addressed by including sufficient repair and construction requirements in the contract’s SOW, BOQ, and SORS. The contract also required a one-year warranty on all construction. If all repair and construction work would have conformed to contract requirements, facility functionality and sustainability would have been much improved. However, non-conforming performance by the contractor will impact this project’s sustainability in years to come.

INSTALLATION SHORTAGES

AIR CONDITIONER (AC) DESCRIPTION	BOQ REQUIREMENTS	UNITS INSTALLED	SHORTAGE
36,000 BTU AC	1	0	1
48,000 BTU AC	10	10	0
24,000 BTU Window AC	32	4	28
24,000 BTU Split-type AC	79	35	44
30,000 BTU Split-type AC	12	4	8
Totals	134	53	81

TABLE 3-5



Site Photo 17. Only two (left rear edge of rooftop) of six split-unit air conditioners required were installed in the new reception center.



Site Photo 18. Contractor delivered generator (bottom left), but never connected and load tested it.



Site Photo 19. Final site where generator was placed by Iraqi Police (IP).



Site Photo 20. Old fuel truck tank placed by IP to supply the generator.



Site Photo 21. 3 X 150 mm² electrical cable supplied on rolls 503 m long. (Photo provided by USACE)

Bab Eshtar Substation 11 kV Feeder Cable, Mosul, Iraq

SIGIR PA-06-073

The project objective was to provide a 12 x 11 kV underground cable feeder system comprising four buried cables for the newly constructed Bab Eshtar 33 kV/11 kV substation, a new addition to the local electrical network. The project was intended to physically install the underground cable feeder system to the new Bab Eshtar 33 kV/11 kV substation. Specifically, the cable was placed in an urban area along and across city streets. Trenching, installation, backfilling, and testing made up most of the requirements. Ministry of Electricity standards laid the groundwork for the entire process.

What We Found

Based on a review of documentation, discussions with USACE personnel familiar with the project, and a brief site visit, the assessment team found that the project was sufficiently planned, designed, and constructed by the contractor. In addition, the contractor's QC and the U.S. government's QA programs were effective. The government effectively adapted to security issues in the area by implementing procedures to use local nationals to perform on-site QA functions for the project.



Site Photo 22. Manufacturer's tag documented amount, size, voltage rating, and insulation.

The assessment team verified that the contractor used cable that met Ministry of Electricity standards. Specifically, the cable was an XLPE-insulated 11 kV 3 x 150 mm² cable supplied on rolls 503 meters long (Site Photo 21). Factory tags affixed to each roll documented cable specifications (Site Photo 22).

After the route of the cable was surveyed, the surface often required special equipment to break up hard surfaces common to an urban environment before trench excavation could proceed (Site Photos 23 and 24).

The Ministry of Electricity required the



Site Photos 23 and 24. Hard surface break-up equipment in preparation of material removal. (Photos provided by USACE)



Site Photos 25 and 26. After the trench was excavated and the base compacted (left), the cable was positioned on a sand layer (right). (Photos provided by USACE)



Site Photos 27 and 28. Cables were spliced together with splice kit (left), and heat was applied (right) to shrink outer cover used to protect cable splice. (Photos provided by USACE)

trench to be compacted and made free from stones, with a standard trench depth of 90 cm. The cable was to be placed in the trench on top of 10 cm of smooth sand to provide a cable bedding material (Site Photos 25 and 26).

Cables were spliced together using a shrinkable splice kit for 3 x 150 mm², 11 kV XLPE cable. This kit includes joining components

and a shrinkable outer cover that tightened when heat was applied (Site Photos 27 and 28).

On July 30, 2006, SIGIR attempted a site visit, but all roads leading to the area with the latest construction activity were blocked. However, on July 31, 2006, the assessment team observed an open trench area at the edge of a city street along the route approved

by the Ministry of Electricity. The assessment team observed an open trench, exposed cable, and tile and warning tape over covered cable, which correlated with the information and documentation provided by the Project Engineer.

Sustainability

The SIGIR engineer reviewed and evaluated sustainability coverage under the current contract for the Bab Eshtar substation 11 kV Feeder Cable project. Because the feeders are buried stationary cables, they offer a high degree of sustainability. Once the feeders have been successfully energized, they are designed to remain in place to carry power to the substation for many years.

USACE-GRD concurred with SIGIR's findings. No recommendations were included in the project assessment report.

Baghdad Police College, Baghdad, Iraq

SIGIR PA-06-078.1 and SIGIR PA-06-079.1

The overall objective of the project was to design and construct a modern police training academy campus at the Baghdad Police College. The new campus is to include new and renovated barracks and training facilities, with an upgraded and new storm-water system, sanitary sewer collection system, potable water system, and electrical service distribution systems. Other improvements included new dining facilities, administrative offices, firing ranges, laundry, athletic and communication facilities, and an improved security perimeter.



Site Photo 29. Existing barracks at the Baghdad Police College.



Site Photo 30. Outside view of new cadet barracks building.

The existing facility comprised a number of buildings, constructed approximately from 1935 to 1940, which were in various stages of decay (Site Photos 29 and 30). These buildings had the capacity to house and train approximately 1,200-1,500 cadets. The ultimate goal of the project was to house and train approximately 4,000 cadets.

What We Found

SIGIR identified construction deficiencies that required prompt attention and separate



Site Photo 31. View of pipe leaking wastewater.



Site Photo 32. Damage to the wall from leaking wastewater.

reporting. Specifically, the improperly fabricated wastewater plumbing (Site Photo 31) in the student barracks could potentially result in reducing load-bearing capacity of the structural slabs and could pose environmental and health hazards to the students, instructors, and workers at the Baghdad Police College.

The extent of potential hazards needs to be determined before any future work at the Baghdad Police College. In an effort to quickly identify and correct the construction problems within the barracks, SIGIR issued a report documenting the deficiencies identified only in the barracks, the apparent cause, and potential recommendations and/or solutions. A separate assessment report will follow next quarter that will thoroughly assess the original objectives for the entire Baghdad Police College project.

During the site visit, the team immediately identified water damage and staining on the ceiling and walls of the ground floor (Site Photo 32).

Because of the inferior plumbing techniques, methods, and bonding materials used

by the contractor to join the wastewater pipes, water, and other waste material continually drains from showers, wash basins, and toilets through the reinforced concrete floors—from the top floor to the second floor to the ground floor. Results include permeating, filling, and contaminating light fixtures, showers, and toilet areas with liquids, including diluted urine and fecal matter (Site Photo 33).

For example, SIGIR observed a light fixture so full of diluted urine and feces that it would not operate. In the second floor bathroom, the assessment team found evidence of large quantities of diluted urine dripping from the top floor through the ceiling. The urine was so pervasive that it had crystallized and permanently stained the ceiling tiles (Site Photo 34). During the SIGIR visit, a substance dripped from the ceiling onto an assessment team member's shirt.

From SIGIR's assessment and discussions with Baghdad Police College personnel, these appear to be the causes of the water damage:

- Floor drains are not adequately sealed to



Site Photo 33. Water damage from leaking ceiling.



Site Photo 34. Crystallized urine on ceiling tile.



Site Photo 35. Typical contractor-built wastewater pipe connection method.



Site Photo 36. Contract-specified wastewater pipe connection is shown on the lower left.

the floor surface and/or properly affixed to adjacent fittings with the proper adhesive or sealant, which causes water to drain outside rather than inside the drain collectors.

- Drains were assembled without the specified molded plastic fittings, which resulted in water and waste materials flowing from the collection trees through the improperly fabricated joints directly into the concrete floors. The contractor used pipes with holes that were hand-cut with secondary pipes inserted (Site Photo 35), rather than the appropriate type of pipe (Site Photo 36).

Corrective Actions Taken by the Contractor

As soon as the buildings started to leak from the top floor to the ground floor, the Director of the Baghdad Police College contacted the contractor. The contractor directed the subcontractor who performed the original work to correct the problem. The subcontractor is currently changing the pipes that contributed to the leaks. The subcontractor also plans to use the pipes with molded plastic fittings, such as the one identified in Site Photo 36, which should eliminate water and waste materials from flowing directly onto the concrete floors.

SIGIR recommended that all project-related work at the Baghdad Police College be assessed and appropriate remedial action be taken to provide assurance that project-related work is structurally sound and that no environmental or health hazards exist. Specifically, USACE should perform an assessment of all wastewater plumbing installations in all

newly constructed buildings, both single- and multiple-storied. This assessment will determine whether similar methods of inadequate plumbing techniques were used in other project locations as were discovered in the cadet barrack buildings.

SIGIR's second recommendation was to perform a critical technical study of the structural integrity and load-carrying capacity, as well as the potential environmental and health hazards posed by the rust, mold, and urine and fecal matter within the concrete floor slabs of the cadet buildings. GRD concurred with the conclusions and recommendations in the report.

The full assessment of the college is underway and will be reported in the next SIGIR Quarterly Report.

Aerial Project Survey Program

The SIGIR Satellite Imagery Group has continued contributing to the SIGIR mission by conducting aerial assessments of U.S.-funded reconstruction projects throughout Iraq. SIGIR imagery analysts provide information obtained through analyses to the project assessment teams in Iraq to help them evaluate project sites that are inaccessible because of security concerns or because they are remotely located. SIGIR also shares the information obtained through aerial assessments with the responsible U.S. government contracting officials in Iraq. The Satellite Imagery Group assists SIGIR with imagery for audits and investigations as needed.



Aerial Image 3. This image provided by NGA shows a completed border fort located along the Iraq/Syria border.

NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY SUPPORT

This quarter, SIGIR imagery analysts have continued working with NGA to provide imagery analysis of Iraqi reconstruction projects. To date, this continuing relationship has resulted in analysis of 76 sites and 6 road segments. This quarter, NGA completed analyses of 25 project sites and 1 road segment for SIGIR. NGA's continued assistance provides an invaluable resource to SIGIR inspectors and proves essential in efficiently carrying out SIGIR's mission in Iraq. These are some of NGA's notable findings provided to SIGIR for the quarter:

- 19 sites appeared to be completed.
- 5 sites appeared to still be under construction.
- 1 border fort could not be located using the supplied coordinates.

The partnership of SIGIR and NGA combines greater resources to meet mission requirements. NGA's assistance and knowledge base increases the number and depth of analysis of projects that can be reviewed and

helps SIGIR provide a more accurate picture of Iraq's reconstruction progress. Above is an example of the imagery provided by NGA.

SIGIR IMAGERY

This quarter, SIGIR imagery analysts completed 9 imagery assessments and created 22 imagery products using commercial satellite imagery and limited available contract information. This imagery provided visual assessments of progress at construction sites. SIGIR shares the imagery products with government contracting agencies to update their project information and to identify any obvious deficiencies. SIGIR assessed and reviewed these sites during the reporting period:

IMAGERY ASSESSMENTS IMAGERY PRODUCTS

- | | |
|--------------------|--------------------------------|
| • 4 clinics | • 6 hospitals/health clinics |
| • 2 garrison units | • 4 border posts |
| • 1 firing range | • 3 electrical substations |
| • 1 courthouse | • 2 water treatment facilities |
| • 1 landfill site | • 2 garrison units |
| | • 1 landfill site |
| | • 1 courthouse |
| | • 1 firing range |
| | • 1 road segment |
| | • 1 gas generation facility |

SIGIR Imagery Assessments

This quarter, SIGIR completed 9 imagery assessments based on satellite imagery and limited contract information. These assessments have been helpful in reviewing the accuracy of inspection reports, providing a visual assessment, and verifying project progress. Geo-coordinates and limited contract information are provided to the imagery analysts from contract databases and contract documents in Iraq. These are some of SIGIR's notable findings from imagery assessments this quarter:

- 8 sites reviewed appeared to be functional, meeting project requirements.
- 1 site reviewed appeared to still be under construction.
- 5 sites could not be reviewed because of inaccurate coordinates.

These findings are provided to the responsible government agencies in Iraq that conduct further reviews of contract status and plan follow-up project assessments.

Imagery taken on March 19, 2005, shows the initial construction of the clinic in progress, with the building support beams visible. Imagery taken on May 15, 2006, shows what appears to be the completed clinic structure with vehicles in the parking lot. There are no visible indications that the project is incomplete or will not meet project requirements (Aerial Image 4).

On imagery taken on March 14, 2005, the only noticeable construction is the ground preparation of the Construction Debris Landfill portion of the Baghdad Landfill. Imagery from February 19, 2006, shows what appears to be a completed landfill. Structures visible as of



Aerial Image 4. A review of imagery taken between March 19, 2005, and May 15, 2006, shows progress made at the Al Thubbat clinic in Baghdad.



Aerial Image 5. A comparison of two images taken on March 14, 2005, and February 19, 2006, shows construction progress of the Baghdad Landfill, outlined in red.

February 19, 2006, comprise the Administration and Truck Maintenance buildings. Also noted are the signs of activity in the first Landfill Cell area. There are no visual indicators that this project does not or will not meet mission requirements (Aerial Image 5).

Imagery Products and Support

This quarter, SIGIR has created imagery products of 22 different sites throughout Iraq. The imagery is used to create imagery assessments, build a visual record of project sites, and provide imagery to support SIGIR's mission. Any visual deficiencies are reported after the imagery is reviewed.

The SIGIR Satellite Imagery Group has also provided imagery to support SIGIR's audit and inspection missions during previous quarters. Imagery support products are used to prepare

for site visits and to identify possible problems; these products include site overviews, project site break-outs, and site assessments. This quarter, the imagery team provided products that SIGIR inspection teams included in the Al Karkh Courthouse and the Baghdad MSW Landfill assessment reports. In partnership with the NGA during the past four quarters, SIGIR imagery analysis has resulted in the completion of 220 cumulative satellite imagery assessments and products, including 48 assessments and products completed this quarter.

Figure 3-2 shows the approximate locations of Aerial Imagery Assessments completed during this reporting quarter.

AERIAL IMAGERY ASSESSMENTS

Figure 3-2
APPROXIMATE LOCATIONS OF THE 48 SITES WHERE AERIAL ASSESSMENTS WERE CONDUCTED, ANALYZED, AND REPORTED THIS QUARTER.

